2017

Filling the GAP in Obesity Prevention: Implementation of the General's Activity Program (GAP) in Carroll County, Kentucky

Brent Emerson
University of Kentucky, brent.emerson@uky.edu

STUDENT AGREEMENT:

I represent that my capstone and abstract are my original work. Proper attribution has been given to all outside sources. I understand that I am solely responsible for obtaining any needed copyright permissions. I have obtained needed written permission statement(s) from the owner(s) of each third-party copyrighted matter to be included in my work, allowing electronic distribution (if such use is not permitted by the fair use doctrine) which will be submitted to UKnowledge as Additional File.

I hereby grant to The University of Kentucky and its agents the irrevocable, non-exclusive, and royalty-free license to archive and make accessible my work in whole or in part in all forms of media, now or hereafter known. I agree that the document mentioned above may be made available immediately for worldwide access unless an embargo applies.

I retain all other ownership rights to the copyright of my work. I also retain the right to use in future works (such as articles or books) all or part of my work. I understand that I am free to register the copyright to my work.

REVIEW, APPROVAL AND ACCEPTANCE

The document mentioned above has been reviewed and accepted by the student's advisor, on behalf of the advisory committee, and by the Director of Graduate Studies (DGS), on behalf of the program; we verify that this is the final, approved version of the student's capstone including all changes required by the advisory committee. The undersigned agree to abide by the statements above.

Brent Emerson, Student

Mark Swanson, PhD, Committee Chair

Corrine Williams, ScD, MS, Director of Graduate Studies

2016

Filling the GAP in Obesity Prevention: Implementation of the General's Activity Program (GAP) in Carroll County, Kentucky

Brent Emerson

University of Kentucky

Filling the GAP in Obesity Prevention:

Implementation of the General's Activity Program (GAP) In Carroll County, Kentucky

Capstone Project Paper

Master of Public Health

University of Kentucky College of Public Health

By: Brent Emerson

Abstract

As obesity rates continue to rise, there is a significant need for public health programs that are able to effectively increase physical activity at the community level. Regular physical activity can help reduce the risk of negative health outcomes associated with obesity including cardiovascular disease, type 2 diabetes, and some forms of cancer while also strengthening muscles, improving mental health and mood, and increasing average life expectancy. Previous research has supported that one way to increase physical activity at the community level is through social marketing of state and local parks. Through the promotion of parks, community residents are able to reduce common barriers to regular physical activity that are often associated with gym memberships and recreational facilities including finances, personal insecurities, and time away from family. Due to the relatively inexpensive marketing costs, the incorporation of social marketing practice has the potential to be a cost-effective way to increase park usage and physical activity that could be utilized in low-income communities throughout the United States. Therefore, the current program proposal will be evaluating a previously conducted randomized control trial that was able to effectively increase park attendance and physical activity through marketing efforts in local California parks and assessing the translatability of these results at the General Butler State Park in Carroll County, Kentucky.

A. Target Population and Need

The disproportionate rate of obesity in Carrol County, Kentucky has prompted the development of a multi-component intervention to promote physical activity within the region. Studies have supported that regular physical activity can serve as a protective factor and reduce one's risk for a variety of negative health outcomes including type 2 diabetes, cardiovascular disease, and obesity [1]. Although research supports that individual level programs are most effective at reducing obesity rates when targeting both nutrition and physical activity , there is a lack of evidence of programs being able to successfully change the food and physical activity environment simultaneously at the community level[2,3].

Due to the complexity of obesity prevention, it is challenging for a program to adequately address barriers to physical activity and nutrition at the community level. Therefore, the purpose of this program is to assess the effectiveness of increasing physical activity as a part of a larger solution to the obesity prevention. If successful, this program evaluation has the potential to serve as a very cost-effective way to increase total physical activity within a variety of communities across the United States.

According to the Centers for Disease Control and Prevention, regular physical activity is one of the most important ways to positively impact health[4]. Regular physical activity can help reduce risk for cardiovascular disease, type 2 diabetes, and some forms of cancer while also strengthening muscles, improving mental health and mood, and increasing average life expectancy[4]. It is estimated that these benefits are observed after reaching the recommended 120 to 150 minutes of moderate-intensity aerobic physical activity a week[4].

As seen in Figure 1, Carroll County had a disproportionately high prevalence of obesity (38%) when compared to Kentucky (32%) and the United States (27%) in 2012[5]. The high prevalence of obesity within this community leaves residents vulnerable to various diseases including diabetes, heart disease,

stroke, and various cancers[6]. This is evident as Carroll County had a reported diabetes prevalence rate of 12% which is higher than the Kentucky average of 10% and the national average of 9% in 2012[5].

Carroll County is a rural county in northwestern Kentucky, bordering the Ohio River[7]. It's 2010 population of 10,811 residents is evenly distributed by age and gender with 51% being male while the median age is 36.6 years old[8]. The residents are 94% white and 20.4% of residents fall below the poverty line[8].

Due to the large proportion of the population that fall below the poverty line, recreational facility membership fees could be a potential barrier to regular physical activity. Although there are recreational facilities and gyms within the county, residents view them as too expensive and report financial concerns as the main reason why they do not utilize these facilities[7]. These financial concerns have the potential to impact the amount of leisure activity within the community, as 29.2% of the population reports not engaging in leisure time physical activity compared to the national average of 22.6% (Figure 2)[8].

Although reported physical activity rates are low, Carroll County has the resources to address the economic barriers to physical activity through utilizing the General Butler State Park. The General Butler State Park has a variety of attractions for physical activity including: over six miles of trials (hiking and biking), Butler Lake (canoeing, paddle boating, and fishing), sport facilities (soccer fields, basketball/tennis courts), and is free to the public[9]. The state park also has numerous pre-existing programs and events that can be utilized to increase attendance and physical activity at the state park including basketball tournaments, yoga classes, scavenger hunts, and walking clubs.

Social Marketing Theory

In efforts to increase the utilization of the state park, this program will use social marketing practice within the community to promote physical activity at the state park. Previous research has

supported social marketing to be effective in increasing physical activity when targeting adults[10,11]. By targeting adults within the Carroll County, the program hopes to develop a social marketing plan that is relevant to the majority of residents while encouraging adults to bring family members and children[12].

Social marketing requires rigorous adherence to a multi-step process to ensure effectiveness of the desired messages and marketing strategy[12]. The main phases of social marketing include identifying a(n): purpose/focus, external factors, target audience, objectives, barriers/benefits, positioning statement, strategic marketing mix (product, price, place, and promotion), evaluation, budget, and implementation plan[12]. Each one of these components of social marketing theory requires a level of understanding that can only be required through formalized training and education. For these reasons, the program with hire a trained social marketer to guide social marketing practice throughout the program.

One way to incorporate social marketing practice would be through connecting specific target populations to pre-existing activities at the state park. For example, if social marketing research reveals that the target population of older adults has a positive perception of basketball, the state park may adapt pre-existing basketball competitions to shorter range lay-up competitions to accommodate the physical limitations of this population. To promote this adaptation, the social marketer will distribute promotional materials through mailing lists of older community residents or place flyers throughout the community where older adults are likely to visit like churches, grocery stores, and restaurants.

Through promoting the utilization of the state park, the proposed program has the potential to reach a large proportion of the community at a very low cost. The majority of promotional efforts will be conducted through social marketing to promote physical activity at the state park by reducing the financial barriers to physical activity. If successful, this program will help guide cost-effective initiatives to increase physical activity in low income communities across the United States.

When intervening at the community level it is important to be able to accurately assess the composition of the community and the potential reach of the program. While the focus of promotional efforts will be on the potential 10,871 residents of Carroll County, this number could grow when including visitors from outside the county and state. With the realization that the only a small percentage of residents regularly use the park, the annual use of the park and projected reach of the program is estimated at 5% or about 543 residents per year. A primary goal of this program is to increase the use of the park's recreational facilities by county residents.

This program will partner with multiple local agencies and individuals to ensure community engagement and cultural appropriateness. Key partners include the Carroll County health department, the school system, the state parks department and General Butler State Park staff, and relevant non-profits and organizations that can assist in the implementation of the program by donating or providing physical activity equipment[13]. By partnering with these organizations, the program will have more support and community buy-in to increase the reach and effectiveness within the community.

B. Program Approach

Evidence Based Program

Recent research suggests that interventions utilizing parks can be an effective strategy to promote physical activity at the community level[14]. Cohen et al. (2013) conducted a randomized control trial to assess the use of community-based participatory research (CBPR) and marketing to increase attendance and physical activity at local parks[15]. The researchers found that park attendance and observed physical activity increased in parks that received the marketing intervention while park attendance and observed physical activity decreased or stayed the same in the control parks[15].

Based on strict inclusion and exclusion criteria the researchers selected 50 parks and assigned them to three different experimental arms: control, park director, park advisory board[15]. These distinct

groups were selected to assess if CBPR and marketing techniques would be successful when engaging a park director or a park advisory board for each park[15]. The results showed that both the park director and park advisory board groups showed very similar significant increases of park attendance and physical activity when compared to the control group[15].

The study of interest recruited subjects through focus groups, home-interviews within a 1 mile radius of the park, and marketing materials including signage that promote various attractions of the park[15]. To assist with marketing, the researchers hired a marketing consultant to help use the information collected during interviews to guide marketing efforts within the community[15].

To assess the effectiveness of this study, the researchers used the evidence-based method of "System for Observing Play and Recreation in Communities" (SOPARC)[15]. Using SOPARC, the researchers followed a strict rotational pattern for observing and counting number of park users and assessing activity levels[15]. To help ensure consistency and validity, members of data collection were thoroughly trained in this method before data collection[15].

The results of this study found that overall attendance and physical activity levels increased in all parks that received the intervention while attendance and physical activity declined or stayed the same in the control group[15]. Furthermore, both the park director group and the park advisory board group had very similar degrees of success when compared to the control groups[15]. The researchers concluded that incorporating CBPR and marketing techniques was an effective way to increase physical activity in low income communities[15].

With promising results, the researchers then conducted an economic analysis that assessed the cost-benefits of total expenses of the park compared to the return of attendance and physical activity[15]. The costs for the program was $4,000 per park (given at the beginning of the study) to be used in areas of signage (banners, shirts, bulletin boards), promotional incentives (water bottles, bags, key chains),

and outreach/support (hiring instructors, buying equipment/material, cameras)[15]. Specific purchases were guided through focus groups, interviews, and the hired social marketing consultant but were ultimately decided by the park director or advisory board[15].

The benefits of the program were calculated to be an average increase of park attendance by 7-12% or about 196 person-hour visits per week per park[15]. Physical activity calculations were conducted in person-hours to account for being unable to determine if the same people were being observed multiple times throughout the week and was analyzed using a previously validated metabolic expenditure (METs) estimates that associates various levels of physical activity to pre-determined METs[15]. The average energy expenditure increased by 610 MET-hours which represents an estimated 1/3 of the total increase since observations were only conducted during 1/3 of the park's open hours[15]. When adding an extra $1,000 for staff training and park assessments to the 4,000 for material the cost per MET-hour gained is $0.28. Previous standards dictate cost-effectiveness if the cost per MET is within the range of 0.50-1.00[15].

Although this research study provides a foundation for future programs, there are several limitations that must be addressed. The first limitation is the lack of detail regarding the community based participatory research protocol within the study. This gives reason to question the feasibility of meeting the intensive criteria of true community based participatory research within 34 experimental parks while giving ownership of most community engagement to the park staff and marketing consultant. Nevertheless, community engagement is an essential component to the program and should be incorporated in future studies.

The second limitation is that although the study was able to support an increase of physical activity within the state park, it is unable to draw conclusions regarding the total increase in physical activity within the community. For example, residents within the community could be maintaining

current physical activity levels while simply changing location to the state park. This requires future programs to assess the location of physical activity in effort to assess the impact on overall physical activity within the community.

The General's Activity Program (GAP)

The previously discussed evidence based study will serve as the basis for the General's Activity Program (GAP) in Carroll County. Since there are minor changes and adaptions to research procedure, the current proposal serves as a program evaluation to assess if similar results would be found when changing populations from urban California to rural Kentucky and from small local parks to large state parks. This program evaluation will add to our understanding of the most effective ways to promote physical activity in low income communities by testing the translatability of a previously determined cost-effective program within a new community. This program evaluation will also assess if the original study has potential to increase total physical activity versus changing location of physical activity.

The first minor adaptation to the original study will be requiring the marketing consultant to use social marketing theory throughout the program. This requirement is hypothesized to increase the effectiveness of the program by incorporating social marketing theory that has been supported to increase physical activity within adults[10,11]. This practice will add a level of academic rigor versus the generalized marketing practice described within the original study.

A second adaptation to the original study will be assessing the location of physical activity within the Carroll County community. To assess the location of physical activity within the Carroll County community, Garmin Forerunner watches will be distributed to park users. Participants who receive the Garmins will be required to upload information regarding physical activity including duration, intensity, and location online to the Garmin Connect program. Data collection requires the participant to connect the watch to a personal computer and synchronize the watch to the Garmin Connect website. This

information will then be accessed and reviewed by the program manager four times a year at the midpoint of spring, summer, fall, and winter. This will allow the program manager to assess if the program has had an effect on total physical activity levels within the community.

In justification for this second minor adaptation, Garmin watches have been used in a variety of studies and have been shown to be effective in analyzing general physical activity trends[16]. However, it is important to note that research has shown that wearable physical activity watches should not be used for precise physical activity and energy expenditure analysis due to the accuracy and reliability errors[17]. Precise measurements can vary across physical activity levels (slight, moderate, and intense) and brands (Apple, Garmin, etc.)[18]. To address these concerns, researchers should eliminate reliability concerns by using the same watch throughout the program and analyze general physical activity trends instead of specific energy expenditures.

The current program fits the needs of the Carroll County community through promoting physical activity while reducing the financial barriers of most recreational facilities. The General Butler State Park provides a free resource for regular physical activity that is needed for residents who fall below the poverty level. If successful, this program will be available to low income areas due to the low implementation costs associated with the social marketing campaign.

Implementation

To implement this program, there will be a variety of key personnel with distinct roles for this program to be successful. The program manager will be in charge of organizing and managing activities and other personnel. The research assistant will be in charge of collecting Garmin and SOPARC data that will be used to evaluate physical activity level at the park and community. The social marketer will be in charge of formulating a social marketing plan for the program and will be in charge of training the park

director in social marketing practice throughout the study. Lastly, the community advisory group (CAG) will assist with community engagement and the biostatistician will assist with program evaluation.

This program will last for three years and will follow a pre-test post-test without a control group design. The first year of the program will consist of training key personnel, collecting baseline information, and conducting formative research. The second and third year of the program will incorporate the use of social marketing practice to increase park attendance and physical activity within the community. Garmin and SOPARC measurements will be collected throughout the three years of the program to assess changes in attendance and physical activity throughout the program. Lastly, social marketing practice will be taught to the park director during the third year to increase sustainability of the project after the conclusion of the program.

Year One- Baseline data collection, community engagement/interviews, CAG formation

The first year of the program will consist of regular community engagement to establish a working relationship with the General Butler State Park and the Carroll County community. During this time, the program manager will reach out to potential community leaders and stakeholders to collect information regarding the community, their beliefs about the state park, and identify venues to promote the park through social marketing. Potential stakeholders include but are not limited to: Three Rivers Health Department, Carroll County School District, Kentucky State Parks Departments, non-profits, and outdoor recreation distributors.

During the first year, the program manager and research assistant will be responsible for interviewing community members throughout the program. These assistants will interview 100 park users selected randomly throughout the park based on areas of projected physical activity during the morning, afternoon, and night. The research staff will also interview 75 residents selected from random households within one mile of the park. The researchers will sample these residents by the following

strata: 25 residents 0-1.25 miles from the park, 25 residents 1.25-2.5 miles from the park, and 25 residents 2.5-5.0 mile from the park. These interviews will focus on perceptions, attendance, and physical activity at the state park.

Garmin distribution will occur during the interview process at the park and will be distributed to the 100 interviewed park using adults. Those who receive the Garmin will be reminded by the program manager via email or phone to upload physical activity data to Garmin Connect online at the midpoint of each season although they are encouraged to regularly record their physical activity throughout the year. This distribution of Garmins will occur at the start of the study in efforts to increase the amount of baseline information before implementation of the program.

The program will also use another 100 Garmins for community-guided events, incentives, and replacements throughout each year of the program. For example, one community-guided event could be to have a competition between designated churches like White Run Baptist Church and Cove Hill Baptist Church to see which church could record the highest level of physical activity. Garmins can be used as incentives during a raffle for residents that regularly visit the park and park events. Lastly, the remaining Garmins will be used for replacements in case they are damaged or lost throughout the program.

Once the research assistant is trained using the SOPARC method and the first 100 Garmins are distributed, baseline information regarding park attendance and physical activity. The SOPARC training will be of highest priority in regards to collecting baseline data of park attendance and observed physical activity across all four seasons during the first year. This information will be used to help measure the effectiveness of the program.

A diverse community advisory group (CAG) will be formed to advise the program manager on implementation and evaluation challenges and to help provide access to locally-available resources and

expertise. This group will work with the program manager to help implement an evidence-based program by identifying key health promotional strategies that are not only effective, but also cost-efficient and socially accepted by the target population of Carroll County.

The GAP Community Advisory Group (CAG)

Name	Position	Expertise
Dr. Georgia Heise	District Director of Three Rivers Health Department	Public Health Department and Community Engagement
Carolyn Jones	Board of Education within Carroll County School District	School Involvement
Dave Jordan	General Butler Manager	Coordinating Park Events
Community Members	Residents	Community needs and values

Program promotion will be heavily reliant on effective social marketing practice and community partnerships to promote access to General Butler State Park. An example of utilizing potential community partners to promote the program would be working with Ms. Jones (CAG member) to pass promotional flyers throughout the schools regarding events at the park.

While the exact social marketing messages will be determined based on formative research, the general nature of messages will be to positively encourage physical activity and will avoid any negative or stigmatizing themes. Through formative research, the research and park staff will ensure that all social marketing materials that are distributed within the Carroll County community are socially considerate and appropriate for all populations within the community. The distribution of Garmins will also be assigned based on park use and will not negatively bias a residents within the community.

The variety of physical activities at the state park that can vary in difficulty and intensity, so the research and park staff must take extra precautions to limit the risk of injury to the community. This includes routine maintenance of the facilities, informative signs on the importance of stretching and

safe physical activity, and providing resources to connect residents to healthcare providers in case of injury. The program team will also ensure that all first aid kits and defibrillators are up to date and that all staff have had first aid training.

Years Two and Three- Implement Social Marketing and Continue Seasonal Measurements

After the first year of social marketing training, surveying the community, enrolling participants in the Garmin study, and identifying key partners the program the program will begin to implement the social marketing intervention (Figure 4). During this time the park manager, under supervision of the social marketer, will interview park users and update their social marketing strategy to fit their target population throughout the year. The research assistant will continue to collect SOPARC and Garmin data seasonally to record park attendance and physical activity. The program manager will follow the same schedule in collecting Garmin data for one week at the midpoint of each season.

To help the park manager with social marketing practice, the social marketer will: make regular personal visits to the park, make recommendations on park image, promote user-friendliness, build a customer base, use special events to promote park programs, and provide advice to the park staff regarding utilization of the $4,000 budget to attract more users. The social marketing program will also use information collected through baseline interviews about perceptions of the state park and events to help guide social marketing efforts.

To help ensure the effectiveness of social marketing practice, the proposed program will hold focus groups twice a year to guide social marketing efforts and test potential messages. These focus groups will be held at the General Butler Lounge and will consist of 10-12 community members and the program manager. The social marketer and program manager will make a considerable effort to recruit a population that resembles the targeted audience that was determined through social marketing efforts. All participants will receive $20.00 and will be provided food for participation.

Fidelity of data collection and implementation will be assured through regular engagement from the program manager. The program manager will be responsible for ensuring that the appropriate personnel are adhering to evidence based social marketing, SOPARC procedure, and that Garmin data is being retrieved and stored online.

Program sustainability must be addressed to continue the success of the program after funding has concluded. To help address these sustainability concerns, this program will connect the General Butler State Park with key community stakeholders to help continue the program after the intervention is complete. For this to be successful there must be adequate buy-in and communication from all parties involved. The General Butler State Park staff will have buy-in in relation to positive job performance as they continue practicing and training evidence-based social marketing and focus groups to meet the needs and desires of the community. The community stakeholders will be local organizations that would like to advertise and increase public relations by sponsoring health centered events at the park. With this hypothesized buy-in and quarterly meetings to increase communication, the researcher believes that this program will be able to sustain itself with relatively low expenses.

The first method of dissemination will be the MyCarrollNews newspaper and flyers delivered to the Carroll County community. These papers will have key findings of the program with important motivational messages to help the community participate in regular physical activity through utilizing the park. The second method of dissemination will be yearly research presentations at the local and state health department. These presentations will go over key findings and results to help influence potential policy makers in the community.

There are several challenges to this project that must be addressed. The first challenge will be ensuring transportation to visit the General Butler State Park. Although Carroll County is the third smallest county in Kentucky, residents may not own personal vehicles due to financial constraints. To

address this challenge, there will be formative research regarding which days and times work best for most participants and the feasibility of affordable public transportation within the community. An alternative option is to encourage using a carpool system with neighbors within the community.

A second challenge will be the weather. It is important to note that physical activity levels fluctuate dependent on season and can impact the evaluation of the program. For evaluation purposes, the measurements will be taken for a week during the midpoint of each season to accommodate for bad weather and differences of days of the week. For physical activity purposes, the program will utilize various seasonal activities that best fit the weather like swimming, hiking, ice skating etc.

Lastly, community support and attendance will be a challenge. To address this challenge, formative research will be conducted to increase the buy in of the personnel listed above in attempt to increase participation. Formative research allows the program manager to assess the important values of the community and possible incentives that would encourage program participation.

Study Design

The GAP will be evaluated using a simple pre-test post-test design without a control group. Key outcomes to be measured are: (1) attendance at the state park, (2) physical activity at the state park, and (3) location of physical activity within the community. This design allows time at the beginning of the research study to collect baseline measurements of the previously discussed variables and engage the community to help guide social marketing practice.

The pre-test post-test design offers multiple strengths for the evaluation of this community-based program. First, there is a large emphasis on learning about the population and engaging local champions to help connect and increase buy-in from the community. Since the researcher plans on gathering this information and engaging the community for the majority of the first year of the project,

there will be adequate time for baseline data collection to help the researchers evaluate the impact of the program and control for seasonal differences.

Due to the lack of an adequate control group, the ability to assume causality of the program's effects on increasing park attendance and physical activity will be assessed by comparing program results to baseline data and by conducting community interviews. By comparing quantitative SOPARC and Garmin data before and after program implementation, the program evaluator will be able to indicate any possible changes of physical activity and attendance at the state park. This will be supplemented with qualitative interviews of community residents to assess for confounding variables that may have impacted these results.

Performance Measures and Evaluation

Formative Evaluation

The first year of the program will be dedicated to formative evaluation as the researchers assess the community's needs and interests regarding frequency of use, perceptions about the General Butler State park, and barriers to physical activity as well as collecting baseline measurements on attendance at the state park and physical activity at the state park and community. This data will provide the program manager with valuable information regarding the community that will be used by the social marketing consultant to help formulate a social marketing plan to increase attendance to the General Butler State Park.

Formative evaluation is an essential aspect of social marketing due to the extensive research required to guide social marketing practice. During this time, the social marketer will emphasize the product (physical activity), price (free to public), place (General Butler State Park), and promotion (tested targeted messages) to increase attendance and physical activity at the state park. By focusing on

these core components of social marketing theory, the social marketer and park manager will have the foundation to develop a social marketing plan that is guided by the community.

The community's thoughts, attitudes, and beliefs will be evaluated through focus groups at the General Butler Lodge, sampling park users at the park, and residents within the surrounding area before the start of the program. This evaluation will assess the barriers, benefits, and motivators of physical activity at the state park while testing messages with the target audience.

Process Evaluation

Process evaluation is essential in ensuring the fidelity of the program to assess the impact of the program on the desired outcomes. The program manager will assist in process evaluation by sending out monthly emails to program staff regarding the program objectives for the month. The program manager will also assess if all the objectives were met during the previous month and will meet with staff to discuss potential barriers to performance.

The research assistant will be required to collect SOPARC and Garmin measurements with the program manager twice a year for quality control and comparisons. This will ensure that there are minimal differences between the interpretations of physical activity among park users between the research assistant and the program manager. The program manager will also review all SOPARC and Garmin data collected throughout the program.

To increase the adherence of uploading Garmin data, the program manager will set alert messages on the Garmin watches that tell participants to upload all physical activity data to the website that week. The program manager will also send out reminders via preferred communication collected during enrollment either by email, text, or phone call. As participants enter data on the website, the research assistant and program manager will review all data for any abnormalities or outliers.

Social marketing practice will be evaluated throughout the program through resident interviews at the park and in the surrounding community. These interviews will assess if the resident was exposed to the social marketing campaign and ensure that the social marketing plan was socially appropriate. Lastly, the hired social marketer will be training the park manager social marketing practice throughout the program and will allow the park manager to implement his own social marketing plan under minimal guidance during the last year. This will assess the effectiveness of the training in hopes that there will be a continuous social marketing training program at the state park at the completion of the study.

Outcome Evaluation

1. To increase attendance and physical activity at the General Butler State Park.

To measure the aim of increasing attendance and physical activity throughout at the General Butler State Park the researcher will be using the "System for Observing Play and Recreation in Communities" (SOPARC) method. The SOPARC requires research assistants to record frequency and intensity of physical activity observed at the park.[19] To ensure consistency and accuracy, the trained observers will follow the pre-designed SOPARC protocol for validity and reliability.

Data collection will occur throughout the state park within small and manageable target areas that have varying levels of physical activity.[19] The trained observers will then record park users' gender, age group, race/ethnicity, and physical activity level on pre-designed score cards (Figure 7).[19] The observed activity levels will be categorized as sedentary, walking, or vigorous based on the observed activity of the participant.[19] To account for varying levels of activity throughout the day, these observations will take place during systematic rotations of the target areas four times a day (early morning, noon, afternoon, and early evening) every day for the duration of one week.[19]

Since it is unreasonable to track the same individuals throughout the week, the measurements of attendance at the park will be measured in person-hours to account for the same individual visiting

multiple days throughout the week. To measure physical activity level, the researchers will use MET measurements to measure level of physical activity.[19] With this measurement, 1 MET-hour is equal to the amount of energy spent to maintain a body at rest.[19] To maintain consistency, the researcher determined that 1.5 METs will be used for sedentary activity (sitting/standing), 3.0 METs for moderate activity (walking), and 6 METs for vigorous activity (running).[19]

Evaluation of attendance and physical activity at the state park will occur at the midpoint for each season for one week by observing participants for one hour within each of the previously determined quadrants. This regular assessment of attendance and physical activity provides continuous outcome evaluation that may be used to guide future program efforts.

2. To assess location and extent of physical activity within the community

To measure the aim of assessing location of physical activity within the Carroll County community, the program evaluator will be distributing Garmin Forerunner watches to park users during interviews at the state park. The Garmin Forerunner is a physical activity watch with GPS capabilities that record the duration, frequency, intensity, and location of recorded physical activity. Participants will be able to keep these Garmins at no cost contingent that the participant agrees to frequently wearing the watch and upload physical activity information online at the midpoint of each season throughout the program.

To be eligible to receive a Garmin, the participant must be older than 18 years, self-identify as a regular park user, and report the desire to engage in physical activity. This inclusion criteria will assure that the Garmins will be used for the target population of adult park users who desire to be physically active. This ensures that Garmins are used throughout the program instead of being neglected.

Garmin data will be collected by the program manager seasonally and will be assessed with the assistance of a hired biostatistician to evaluate if social marketing programs at the state park increases total physical activity within the community.

3. To decrease obesity within the Carroll County community.

To measure the aim of decreasing obesity with the Carroll County community, the researcher will rely on yearly Behavioral Risk Factor Surveillance System (BRFSS) measurements regarding the obesity rates within the community. The BRFSS is a national health surveillance system that utilizes telephone surveys to collect health data from United States residents relating to risk behaviors, chronic health conditions, and use of preventative services.[20] The variables of interest for Carroll County are height, weight, BMI, and frequency of leisure activity.

It is important to note the significant limitations in assessing this aim through BRFSS measurements. The first limitation is that BRFSS takes a significant amount of time to release health information that is outside the control of the program manager. Secondly, as previously discussed, the expectations of significantly effecting obesity rates at the county level is minimal due to the complexity of obesity.

Reliability and Validity of Measures

Studies have supported that the SOPARC method is both reliable and valid in assessing leisure time physical activity.[19] The SOPARC method exceeds 94% inter-observer ratings when assessing age, race, and activity level.[19] Furthermore, the SOPARC method shows similar validity results of competitive physical activity measurement like Planned Activity Check (Placheck) and System for Observing Play and Leisure in Youth (SOPLAY) .[19]

Garmin Forerunner watches have been shown to have high validity with low reliability when assessing physical activity level[17,18]. With the assistance of GPS technology, the Garmin is effective in measuring general trends in physical activity[17]. However, the consistency of measuring specific physical activity at various activity levels have been shown to be unreliable[16].

Furthermore, these measurements may not be reliable as there are numerous ways for the computer to record false data on individual physical activity due to user error. For example, participants may give the watch to a friend to record an inflated measurement of physical activity. This requires continuous monitoring from the program manager to ensure the validity of Garmin data.

Studies have shown mixed results regarding the reliability and validity of specific BRFSS measurements. The Behavioral Risk Factor Surveillance System (BRFSS) measurement is both valid and reliable when assessing height, weight, BMI, leisure time activity[20,21]. However, there is reason to believe that the self-report method may have increased reliability but may not have high validity as participants may consistently over or under report physical activity levels[21]. This refers to the notion that participants may regularly over-estimate or under-estimate physical activity levels in efforts to socially or internally validate their current physical activity lifestyle.

Projected Subjects

Potential Subjects- Carroll County Population

Total Population- 10,871
Gender: Males- 5,584 Females- 5,287
Age: 0-17 – 2,738 18-34 – 2,409 35-54 – 2,868 55 and older – 2,856
Race: White – 10,211 Black – 187 Asian – 119 Native American- 14 Pacific Islander- 0

Projected Subjects-5% of Population

Total Population- 543
Gender: Males- 279 Females- 264
Age: 0-17 – 136 18-34 – 120 35-54 – 143 55 and older – 142
Race: White – 510 Black – 9 Asian – 5 Native American- 1 Pacific Islander- 0

The tables above show the total number of potential and projected subjects reached by the program[8]. Projections were based on a 5% attendance rate of the General State Park within Carroll County with the understanding that visitors from outside Carroll County may also use the state park.

Capacity of Applicant Organization

As a major research university, the University of Kentucky has the required capacity and experience to implement this program within Carroll County. Founded in 1865, the University of Kentucky has a long history in serving the community in the areas of education, research, service, and healthcare. To date, the University of Kentucky has earned more than 80 national rankings for academic and research excellence spanning across all 16 colleges, 76 multidisciplinary research centers, 31 core research facilities, and the Graduate School.

The University of Kentucky is one of 108 private and public universities in the country to be classified a research university with very high research activity by the Carnegie Foundation for the

Advancement of Teaching. The Carnegie Foundation also has classified the University of Kentucky in its 2015 Community Engagement Classification which recognizes institutions that provide evidence of substantial engagement and contribution to the surrounding communities. The success of the research activity is reflective in the ability to successfully find funding as the University of Kentucky faculty and staff brought in 285.1 million dollars in sponsored project awards and 153 million in federal agency funding in 2015.

The University of Kentucky has had success implementing programs targeting negative health outcomes across variety of areas. For example, the Kentucky Health Access Nurturing Development Services (HANDS) and the Appal-TREE project are both programs that the University of Kentucky successfully has and continues to implement within the community to improve healthcare and nutrition of those in need. These programs required regular community engagement/partnerships, data collection, analysis, and dissemination of key findings. The University has the infrastructure to successfully implement these programs by having the following amenities: an Institutional Review Board, an office of research integrity, research faculty, community health partners, biostatisticians, and student assistants who all play an essential role for implementing and analyzing research programs.

The mission of The University of Kentucky is to be a public, research-extensive, land grant university dedicated to improving lives through excellence in teaching, research health care, cultural enrichment, and economic development. The mission of the university aligns with the current program evaluation as the results will be used to help improve the lives of the Carroll County community through increasing physical activity within the community. The university believes this is important as various disciplines within the university are researching innovative ways to reduce obesity.

The importance of being active and giving back to the community has allowed the University of Kentucky to develop and maintain crucial partnerships to improve community health. This is evident as

the University of Kentucky is part of The Public Health Practice-Based Research Networks (PBRN) Program that includes partnerships with more than 1,000 state and local public health agencies operating in 26 states for the purpose of conducting applied research studies that examine the organization, financing, and delivery of public health services and their impact on population health.

Due to the success in the previously discussed areas of research, community engagement, partnerships, and funding, The University of Kentucky has the capability of overcoming potential obstacles that may arise during the program. Furthermore, the institutional review board and the Office of Research Integrity will ensure that all those involved in the program will be in accordance to all rules and regulations that protect the community against malpractice and discrimination.

Partnerships and Collaborations

The General Butler State Park and staff are essential in the successful implementation of this program. The park manager will be responsible for learning evidence-based social marketing and designing the park's social marketing strategy with the assistance from the social marketing consultant, focus groups, CAG meetings, and staff input. Other staff members will continue their responsibility for the regular maintenance and presentation of the state park to ensure that guests have a positive experience. Although these tasks can be labor intensive and time consuming, the state park already performs the majority of these tasks and has a self-interest in learning new evidence-based social marketing techniques to promote their parks which would lead to job security and financial gains for the park. (A letter of support has been attached to the proposal)

To increase the effectiveness and success of the program, there will be a considerable effort to connect with stakeholders and potential partners with Carroll County that could be reached to increase physical activity within the community. One of the potential partners will be the Kentucky Department of Public Health and the Three Rivers Health Department. By partnering with the state and local health

department, the program will be gaining experience and expertise in community engagement and obesity prevention.

Goodwill Industries could be a potential partner that would be able to provide affordable athletic equipment for those who are under economic stress within Carroll County. One of the most significant barriers to leisure time activity is the inability to pay for recreational facility memberships. Through promoting physical activity at the park and partnering with Goodwill Industries, the program helps to reduce the financial barriers to physical activity. (A letter of support has been attached to the proposal)

Project Management

Principal Investigator

Emily Edmiston will serve as the Principal Investigator for this program aimed to increase physical activity within the Carroll County Community. As Principal Investigator, Emily will be accountable for the project and the University of Kentucky's reputation while working within this community. Ms. Edmiston will also be responsible for hiring all personnel and will answer any questions in regards to academic integrity, theory implementation, and the literature of increasing physical activity.

Based on Ms. Edmiston's past experiences working as a Project Manager, she has the knowledge, skills, and expertise needed to manage project activities and personnel. As a Project Manager, Ms. Edmiston excelled in management of resources, data collection, and communication within the research team and key community members.

Project Manager

A Project Manager (to be hired) will be responsible for the day to day management of resources and the fidelity of program protocol to meet the objectives set out by the program. This position includes formulating monthly reports regarding the progress of the program and identifying any perceived barriers within the project. These reports will be shared with the park staff and research assistant each month to ensure progress while addressing any major concerns. As Project Manager, he/she is responsible for working with members of the project to propose possible solutions if any issues were to arise regarding project implementation, data collection, and analysis.

The Project Manager will also attend all meetings and will present progress reports to the CAG and park staff. Furthermore, the Project Manager will also work with the social marketing consultant to train General Butler State Park Staff and lead focus groups within the Carroll County community. Due to the high levels of involvement within the Carroll County community, the principal investigator plans to hire a Project Manager that lives within the county. It is important for the manager to be part of the community to increase acceptance and participation to the program.

Social Marketing Consultant

Alex Samotis will be hired as a part-time social marketing consultant for this project. This position requires Mr. Samotis to spend time within the Carroll County community collecting data on the needs, interests, and demands of the residents. Furthermore, Mr. Samotis will be in charge of formulating social marketing tools/techniques that are effective within the community. To collect data about the community, Mr. Samotis will work closely with the Project Manager to run focus groups and to increase acceptance with the community. Lastly, Mr. Samotis will be in charge of training pre-existing park staff in effective social marketing techniques.

Biostatistician

Dr. Nathan Lentz will be hired as a part-time biostatistician to help with the statistical analysis required during the formative, process, and outcome evaluation process. Dr. Lentz will be involved in the planning stages of the program to ensure effective practice for statistical analysis. Furthermore, Dr. Lentz will also be involved in the outcome evaluation process to evaluate the success of the program.

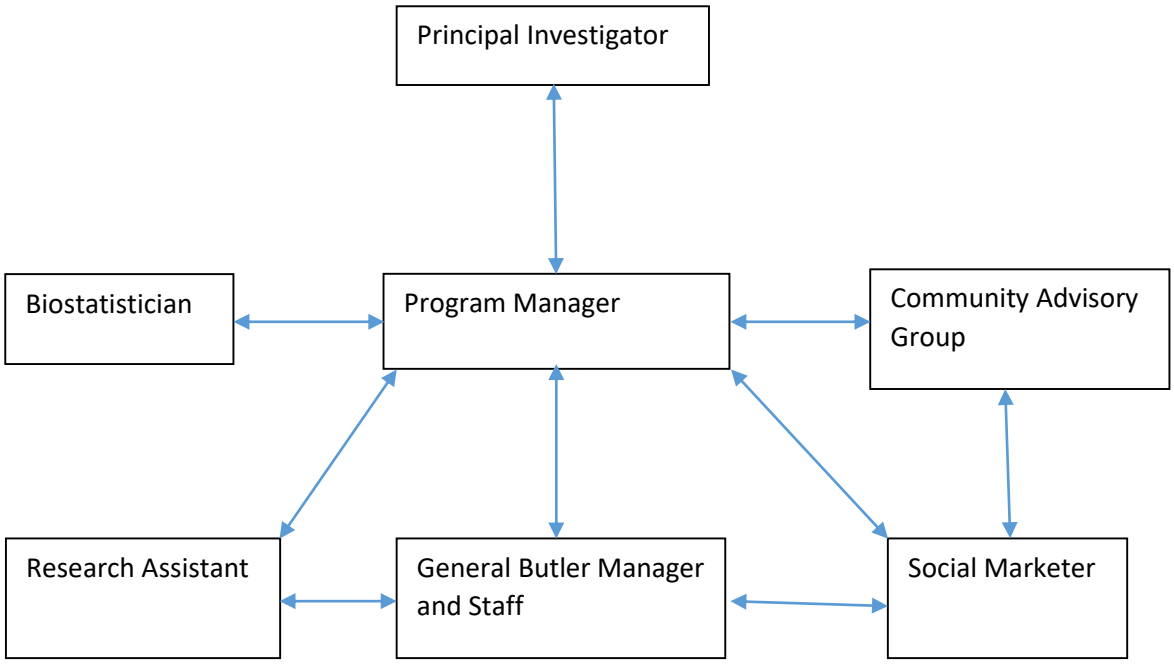
Research Assistant

This program evaluation will employ one research assistant to help with SOPARC and Garmin data collection. The research assistant will work closely with the program manager to ensure that the data is being collected and recorded properly. Measurements will be collected at the midpoint of each season for one week throughout the three years of the program. When the research assistant is not collecting data, he/she will be assisting with various tasks like conducting interviews with residents, assisting in focus groups, distributing Garmins etc.

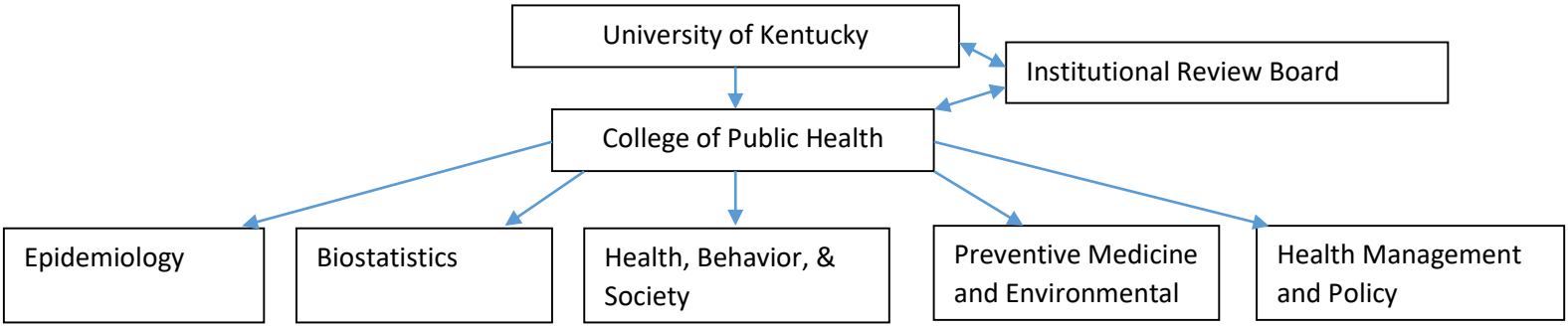
Park Director and Staff

To increase sustainability and effectiveness, the research team aims to work with the park staff to increase physical activity and attendance. The researcher acknowledges that these staff members may not have the extra time to meet the demands of the program; however, the research team and manager aim to assist to establish a collaborative effort to increase efficiency wherever possible. The park director will be trained in social marketing practice and the park staff will be trained in SOPARC data collection at the completion of the study if desired.

Project Management Diagram



University of Kentucky Organizational Chart



Faculty:

Kathryn Cardarelli PhD

Erin Abner PhD

Sabrina Brown DrPH

Steve Fleming PhD

Steve Browning PhD

Wayne Sanderson PhD,MS

Nancy Schoenberg PhD

April Young PhD

Faculty:

Heather Bush PhD

Richard Charnigo PhD

Li Chen Phd

Jennifer Daddysman MS

Emily Dressler PhD

David Fardo PhD

Bin Huang DrPH

Richard Kryscio PhD

Brent Shelton PhD

Michael Singleton PhD

Philip Westgate PhD

Olga Vsevolozhskaya PhD

Chi Wang PhD

Faculty:

Mark Swanson PhD

Kathryn Cardarelli PhD

Robin Vanderpool DrPH, CHES

Corrine Williams ScD, MS

Christina Studts PhD

Richard Crosby PhD

Kate Eddens PhD

Angela Carman DrPH

Sarah Cprek MPH

Richard Clayton PhD

Ramona Stone PhD, MPH

Margaret McGladrey

Faculty:

Wayne Sanderson PhD, MS

David Mannino MD

James Holsinger MD, PhD

Nancy E. Johnson DrPH, MSPH

Terry Bunn, PhD

Wenqi Gan MD, PhD

Anna Hoover PhD

Tisha Johnson MD, MPH

Susan Pollack MD

Betty Ouyang MD, MPH

Faculty:

Eli Capilouto DMD, ScD, MPH

Ty Borders PhD

Julia Costich JD, PhD

Kathi Harp PhD

Richard Ingram DrPH

Cezar Mamaril PhD

Glen Mays PhD, MPH

Sarah Wacherbarth PhD

Hefei Wen PhD

Budget Justification

Time Period: August 1, 2017-August 1, 2020

A. Salaries and Wages

Note: Salaries Escalate at a Rate of 3% per Project Year; Totals Below Reflect Year 1 Request

Position Title and Name	Annual Salary	% FTE	Salary Requested	Fringe Requested	Total Requested
Principal Investigator Emily Edmiston, Ph.D	$110,000	10%	$11,000	$3,477	$14,477
Project Manager (Vacant*)	$65,000	100%	$65,000	$25,208	$90,208
Social Marketer Alex Samotis, MMS	$70,000	100%	$70,000	$26,481	$96,481
Biostatistician Nathan Lentz, Ph.D	$100,000	15%	$15,000	$4,942	$19,942
Research Assistant (Vacant*)	$35,000	100%	$35,000	$18,833	$53,833
Total Personnel			$196,000	$78,941	$274,941

Emily Edmiston, Ph.D, Principal Investigator. Dr. Edmiston will spend 10% of her time/effort to direct this program to increase physical activity at the General Butler State Park. She is a graduate of the University of Michigan's Ph.D program in Health Behaviors where she specialized in Community Based Participatory Research (CBPR).

Project Manager- TBD. The appointed Project Manager will spend 100% of their time/effort in managing the day to day operations of the program. The Project Manager will be a current resident of Carroll County with experience in Public Health.

Alex Samotis, MMS, Social Marketer. Alex Samotis will spend 50% of his time/effort as a social marketer and social marketing trainer for the General Butler State Park Staff. Mr. Samotis received his Master's in Management Studies from Duke University and specializes in community engagement and focus group analysis.

Nathan Lentz, Ph.D, Biostatistician. Dr. Lentz will spend 15% of his time/effort as a biostatistician to assist with statistical analysis. The majority of his time will be concentrated during the formative and outcome evaluation stages and will serve as a contact to the Project Manager during process evaluation. Dr. Lentz received his Ph.D from the University of Kentucky and serves as a consultant.

Research Assistant-TBD. The hired research assistant will spend 100% of their time/effort in assisting the project team with promotional activities at the General Butler State Park. This staff member will also serve as a secondary reviewer/data collector and will work closely with the Program Manager.

B. Supplies

Category	Year 1	Year 2	Year 3	Total Requested
Marketing (signage, outreach)	$4,000	$4,000	$4,000	$12,000
Garmin Forerunner	$12,500	$12,500	$12,500	$37,500
Total Supplies:	$16,500	$16,500	$16,500	**$49,500**

The supplies were strictly based on the original study to preserve the fidelity of cost-effective analysis of this program. Since the original study was over the span of one year, the researcher decided to keep the marketing cost per year at the fixed rate and calculated training costs for the subsequent years using a conservative 50% turnover rate within the General Butler State Park Staff.

The Garmin Forerunner 15 (010-01241-20) is priced at $120.00 per unit.

C. Travel

	Year 1	Year 2	Year 3	Total Amount Requested
Amount Requested	$10,000	$10,000	$10,000	**$30,000**

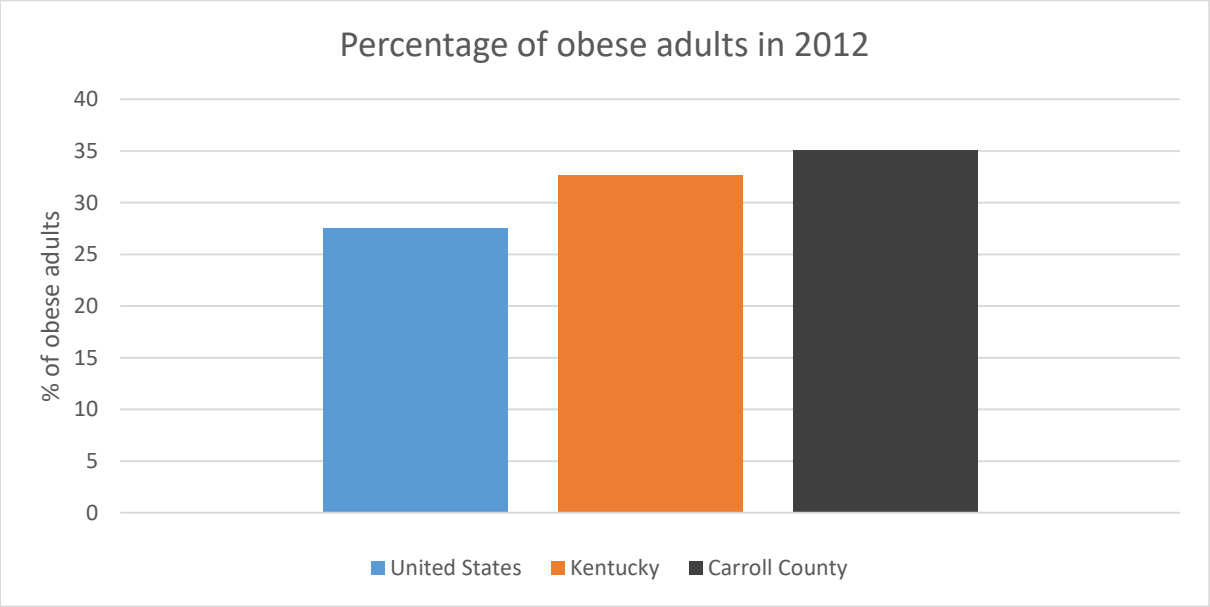
Travel expenses were calculated for any necessary travel expenses for research team members located outside of Carroll County and yearly conferences. Lastly, the budget remained conservative in case the research team is unable to find an appropriate program manager in Carroll County.

E. Summary of Funds Requested

	Year 1	Year 2	Year 3	Total
Salary	$274,942	$240,575	$261,996	$777,513
Supplies	$16,500	$16,500	$16,500	$49,500
Incentives	$15,000	$15,000	$15,000	$45,000
Travel	$10,000	$10,000	$10,000	$30,000
F&A	$96,515	$86,033	$92,566	$275,114
Total	$412,956	$368,108	$396,063	**$1,177,128**

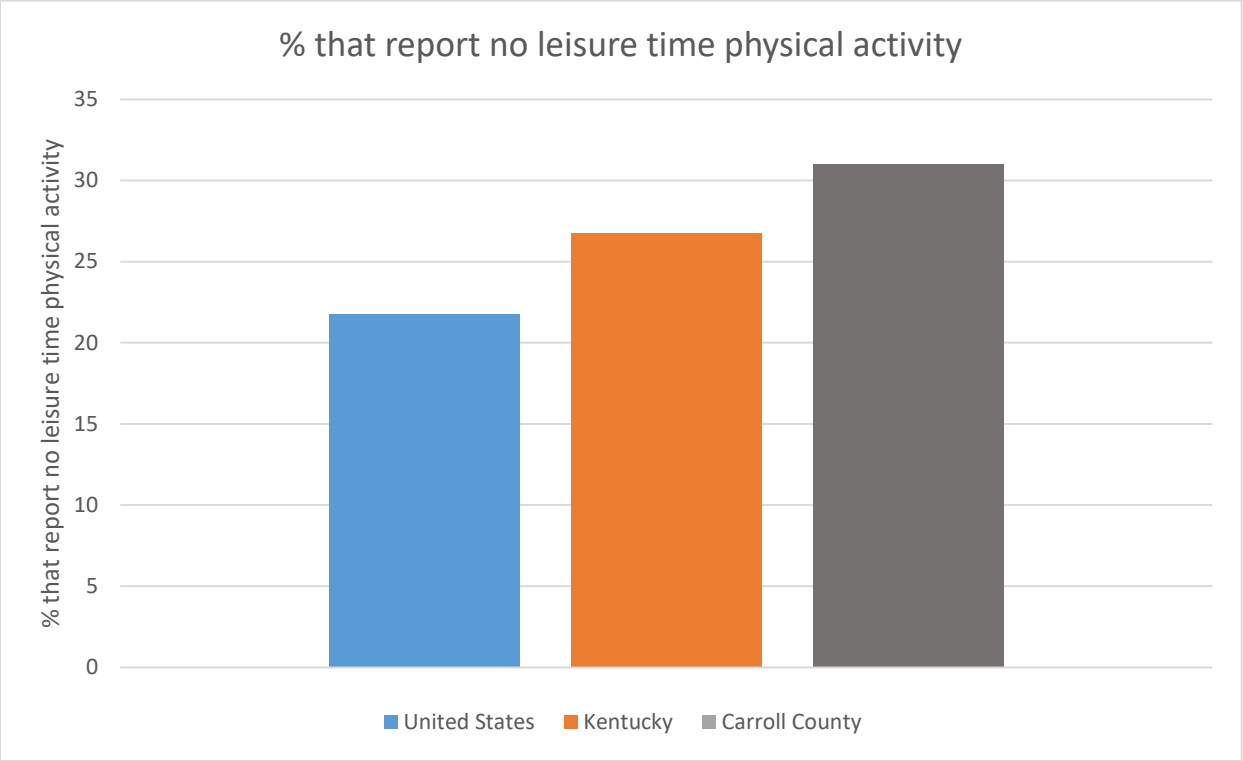
Appendix

Figure 1- A comparison of the percentage of obese adults across United States, Kentucky, and Carroll County



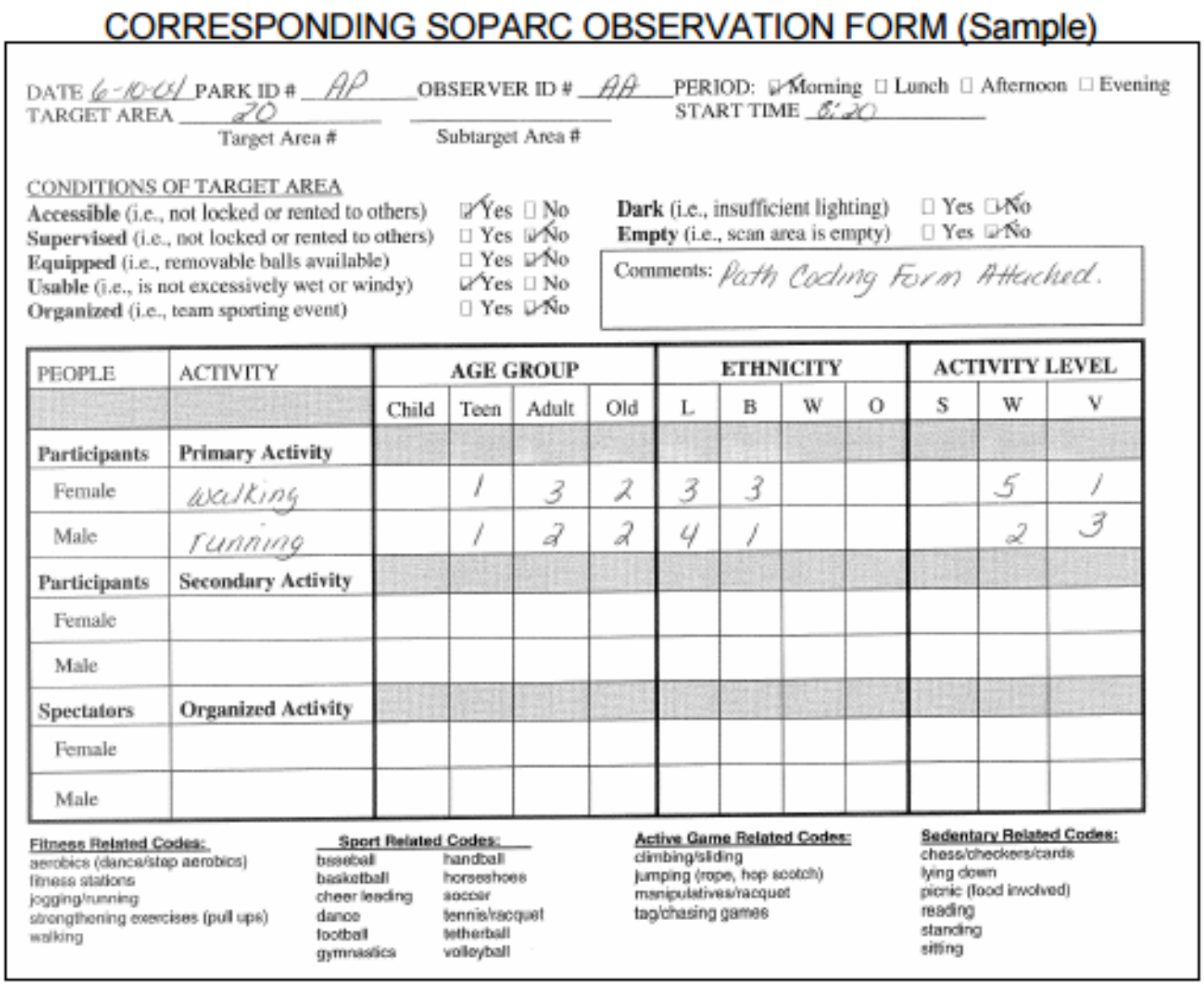
Data retrieved from Centers for Disease Control and Prevention (2013) National Center for Chronic Disease Prevention and Health Promotion.

Figure 2- A comparison of the percentage that report no leisure time physical activity across the United States, Kentucky, and Carroll County



Data retrieved from United States Census Bureau (2010) American Community Survey.

Figure 3- Illustration of the SOPARC measurement



CORRESPONDING SOPARC OBSERVATION FORM (Sample)

DATE 6-10-01 PARK ID # AP OBSERVER ID # AA PERIOD: ☑ Morning ☐ Lunch ☐ Afternoon ☐ Evening
TARGET AREA 20 START TIME 8:20
Target Area # Subtarget Area #

CONDITIONS OF TARGET AREA

Accessible (i.e., not locked or rented to others)	☑ Yes	☐ No	**Dark** (i.e., insufficient lighting)	☐ Yes ☑ No
Supervised (i.e., not locked or rented to others)	☐ Yes	☑ No	**Empty** (i.e., scan area is empty)	☐ Yes ☑ No
Equipped (i.e., removable balls available)	☐ Yes	☑ No		
Usable (i.e., is not excessively wet or windy)	☑ Yes	☐ No		
Organized (i.e., team sporting event)	☐ Yes	☑ No		

Comments: Path Coding Form Attached.

PEOPLE	ACTIVITY	AGE GROUP				ETHNICITY				ACTIVITY LEVEL		
		Child	Teen	Adult	Old	L	B	W	O	S	W	V
Participants	**Primary Activity**											
Female	walking		1	3	2	3	3				5	1
Male	running		1	2	2	4	1				2	3
Participants	**Secondary Activity**											
Female												
Male												
Spectators	**Organized Activity**											
Female												
Male												

Fitness Related Codes:
aerobics (dance/step aerobics)
fitness stations
jogging/running
strengthening exercises (pull ups)
walking

Sport Related Codes:
baseball, basketball, cheer leading, dance, football, gymnastics, handball, horseshoes, soccer, tennis/racquet, tetherball, volleyball

Active Game Related Codes:
climbing/sliding
jumping (rope, hop scotch)
manipulatives/racquet
tag/chasing games

Sedentary Related Codes:
chess/checkers/cards
lying down
picnic (food involved)
reading
standing
sitting

Illustration retrieved from Cohen et al. (2013)

Figure 4. The General's Activity Program (GAP) Gantt Chart

	Year 1				Year 2				Year 3			
	Summer	Fall	Winter	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter	Spring
Community interviews	X	X		X		X		X		X		X
Focus Groups		X		X		X		X		X		X
Garmin distribution	X	X										
CAG Meetings	X		X		X		X		X		X	
Social Marketing/SOPARC Training	X		X				X				X	
Social Marketing Practice					X	X	X	X	X	X	X	X
Continuous Outcome Evaluation (Garmin and SOPARC)		X	X	X	X	X	X	X	X	X	X	X

Program: The General's Activity Program (GAP) Logic Model
Situation: Increasing attendance and physical activity at the General Butler State Park

Inputs	Outputs		Outcomes -- Impact		
	Activities	*Participation*	*Short*	*Medium*	*Long*
Program Staff Park Staff Time Money Social Marketing Supplies Garmins General Butler State Park	Park Interviews Community Interviews Focus Groups CAG meetings Social Marketing Training and Distribution Park Activities: Running, Hiking, Tennis, Soccer Basketball etc. Garmin Distribution	Program Staff Park Staff Carroll County Residents Community Advisory Group	Increase positive perceptions of the park Increase positive perceptions of physical activity Increase attendance at the General Butler State Park	Increase physical activity at the General Butler State Park	Lower the risk of obesity related health outcomes (cardiovascular disease, diabetes, etc.) by 5% within 10 years Reduce obesity rates within Carroll County by 5% within 10 years

Assumptions:
General Butler will be a cooperative program partner
The Carroll County Community will desire to become more active

External Factors
Weather
Prioritizing time and time management for extracurricular activities

Letters of Support

Ms. Edmiston,

I am happy to hear that the University of Kentucky is interested in increasing physical activity within the Carroll County community. As manager of the General Butler State Park, I believe that we can provide an important resource to improve quality of life within our community. I think physical activity is very important to reduce harmful health outcomes and Carroll County would benefit greatly from your program.

I would be more than happy to become educated and trained in social marketing practice to increase attendance at the state park. Personally, I feel that we can improve our current marketing strategy to better understand our target audience. This training would be a great asset to my resume and it has the potential to positively impact my job performance at the state park.

I am very excited to meet with you, and I will assist you throughout your program in any way that I can.

Sincerely,

Dave Jordan

General Butler State Park Manager

Ms. Edmiston,

Thank you for reaching out to us as a potential partnership for your program. As part of our mission statement, we are always looking for new ways to serve those less fortunate within our community. I think that we could reach a mutually beneficial agreement regarding potential exercise clothes and equipment to help support your program.

As the GoodWill manager, I have agreed to pull relevant exercise equipment and clothes aside for your program. Not only will they be clearly marked within the store, we will also notify you of incoming supplies for you or your program team to come by and purchase at a 25% discount. Supplies that you are not interested will be for sale for the community.

I am excited to meet with you, and I am happy that you have decided to implement your program within Carroll County. I am sure they will welcome you with open arms, and I am happy that our supplies will be put to good use.

Sincerely,

Susan Ward

GoodWill Manager

Works Cited

1. Shiroma EJ, Cook NR, Manson JE, et al. Strength Training and the Risk of Type 2 Diabetes and Cardiovascular Disease. *Med. Sci. Sports Exerc.* Jan 2017;49(1):40-46.
2. Miller WC, Koceja DM, Hamilton EJ. A meta-analysis of the past 25 years of weight loss research using diet, exercise or diet plus exercise intervention. *Int. J. Obes. Relat. Metab. Disord.* Oct 1997;21(10):941-947.
3. Sevick MA, Dunn AL, Morrow MS, Marcus BH, Chen GJ, Blair SN. Cost-effectiveness of lifestyle and structured exercise interventions in sedentary adults1: Results of project ACTIVE. *Am. J. Prev. Med.* 7// 2000;19(1):1-8.
4. Centers for Disease Control and Prevention (2015). Physical Activity-Physical Health Basics-Physical Activity and Health. URL: https://www.cdc.gov/physicalactivity/basics/pa-health/index.htm on March 10, 2017.
5. Centers for Disease Control and Prevention (2013). National Center for Chronic Disease Prevention and Health Promotion. Retrieved through Community Commons: http://assessment.communitycommons.org/CHNA/report?page=5&reporttype=libraryCHNA on October 14, 2016.
6. The Global Burden of Metabolic Risk Factors for Chronic Diseases C. Metabolic mediators of the effects of body-mass index, overweight, and obesity on coronary heart disease and stroke: a pooled analysis of 97 prospective cohorts with 1·8 million participants. *Lancet.* 2014;383(9921):970-983.
7. Three Rivers District Health Department (2015). Board of Health Members. Retrieved from https://www.trdhd.com/page/boards-of-health on October 14, 2016.
8. United States Census Bureau (2010). American Community Survey. Retrieved through Community Commons: http://assessment.communitycommons.org/CHNA/report?reporttype=libraryCHNA on October 14, 2016.
9. Kentucky State Parks (2016). The Friends of Butler. Retrieved from http://parks.ky.gov/parks/resortparks/general-butler/ on October 14, 2016
10. Gordon R, McDermott L, Stead M, Angus K. The effectiveness of social marketing interventions for health improvement: what's the evidence? *Public Health.* Dec 2006;120(12):1133-1139.
11. Xia Y, Deshpande S, Bonates T. Effectiveness of Social Marketing Interventions to Promote Physical Activity Among Adults: A Systematic Review. *J Phys Act Health.* Nov 2016;13(11):1263-1274.
12. Luca NR, Suggs LS. Theory and model use in social marketing health interventions. *Journal of health communication.* 2013;18(1):20-40.
13. United States Census Bureau (2010). County Business Patterns. Retrieved through Community Commons: http://assessment.communitycommons.org/CHNA/report?page=3&id=401&reporttype=libraryCHNA on October 14, 2016
14. Brownson RC, Housemann RA, Brown DR, et al. Promoting physical activity in rural communities: walking trail access, use, and effects. *Am. J. Prev. Med.* Apr 2000;18(3):235-241.
15. Cohen DA, Han B, Derose KP, Williamson S, Marsh T, McKenzie TL. Increasing Physical Activity in Parks: Results of a Randomized Controlled Intervention Trial Using Community-Based Participatory Research. *Am. J. Prev. Med.* 2013;45(5):590-597.

16. Price K, Bird SR, Lythgo N, Raj IS, Wong JY, Lynch C. Validation of the Fitbit One, Garmin Vivofit and Jawbone UP activity tracker in estimation of energy expenditure during treadmill walking and running. *J. Med. Eng. Technol.* Apr 2017;41(3):208-215.
17. Fokkema T, Kooiman TJ, Krijnen WP, CP VDS, M DEG. Reliability and Validity of Ten Consumer Activity Trackers Depend on Walking Speed. *Med. Sci. Sports Exerc.* Apr 2017;49(4):793-800.
18. Dooley EE, Golaszewski NM. Estimating Accuracy at Exercise Intensities: A Comparative Study of Self-Monitoring Heart Rate and Physical Activity Wearable Devices. Mar 16 2017;5(3):e34.
19. McKenzie TL, Cohen DA, Sehgal A, Williamson S, Golinelli D. System for Observing Play and Recreation in Communities (SOPARC): Reliability and Feasibility Measures. *Journal of physical activity & health.* 2006;3 Suppl 1:S208-S222.
20. Nelson DE, Holtzman D, Bolen J, Stanwyck CA, Mack KA. Reliability and validity of measures from the Behavioral Risk Factor Surveillance System (BRFSS). *Soz. Praventivmed.* 2001;46 Suppl 1:S3-42.
21. Yore MM, Ham SA, Ainsworth BE, et al. Reliability and validity of the instrument used in BRFSS to assess physical activity. *Med. Sci. Sports Exerc.* Aug 2007;39(8):1267-1274.